





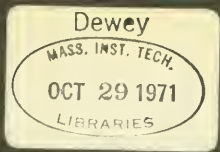
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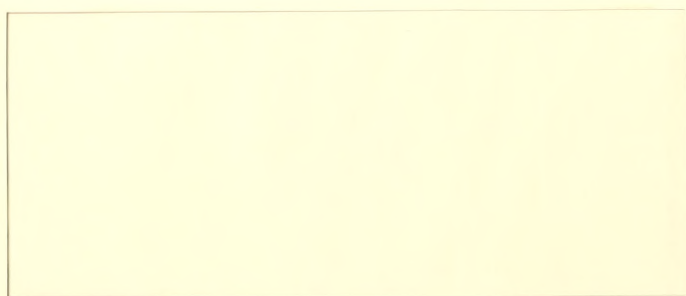
HOUSING DEVELOPMENT IN JAPAN

by  
Paul M. <sup>Winston</sup>Goldberg

August 1971

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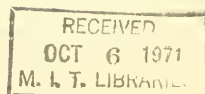
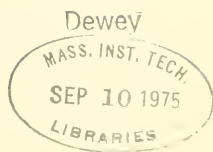
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## INTRODUCTION

This study provides an overview of housing development in Japan for Western readers. Its chief objective is a comparison between the operations of Japanese and American housing institutions. The report begins with an overview of the housing section in Japan, which is followed by more detailed analyses of construction and financing operations. The final chapter is devoted to a description of the Japanese new towns.

A note on sources of information is in order. As the sparse bibliography indicates very little information on the topic is available, at least in the English language. Most data was gathered from informal interviews with participants in the Japanese housing industry or from unofficial documents. All statistical inputs came from the 1968 editions of the Housing Survey of Japan and the HUD Statistical Yearbook.

The field work for the study took place during the summer of 1970 as part of the Intercultural Communications Program of the Sloan School under the direction of Dr. Richard Robinson. All expenses were met by a grant from the United Fruit Company.

The following people have been extremely helpful to me in the course of the study, and I would like to take this opportunity to acknowledge my appreciation:

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## CHAPTER I

### FACTORS IN THE DEMAND FOR HOUSING

Throughout the twentieth century, the Japanese people have never had adequate housing. This condition is generally attributed to two factors: rapid industrialization and war. At the same time, however, Japan has had slum conditions as we know them in the United States in very few areas. Japan has been able to achieve this somewhat paradoxical combination of an absence of slum conditions and a chronically inadequate housing supply mainly through the use of employer-provided housing. These have consisted of dormitories for single workers and, to some extent, houses for married workers. At the same time, an extensive public health system has been able to control disease and squalor in most of the poor privately owned urban areas. A most important factor is the simple living requirements of the Japanese people; they are able to exist with far fewer household facilities and pieces of furniture than their western counterparts.

Public housing was unknown in Japan until the 1920's. In 1923, Japan suffered a severe earthquake which destroyed about one-fifth of the total number of homes then standing. These were rebuilt in large part by public grants to the local communities. In the 1930's, the depression caused housing problems to become acute and the government gave loans to employers for housing development. This, however, proved to be an inadequate remedy, and up through the war Japan's population remained severely overcrowded. During the war people slept in all sorts of shelters, some of which were not designed for housing. For example, a chicken coop was not an unusual dormitory, and the same bed was frequently shared by many people sleeping in shifts.

Figures for the total amount of houses destroyed by bombing during World War II vary from source to source. It can, however, be assumed that a minimum of one-sixth of the entire nation's housing was destroyed in that manner. In all likelihood, more than half of the housing in the major urban areas was destroyed by bombing. After 1945, no loans were available for housing, as it was not considered a good investment. Among the factors contributing to the unpopularity of housing as an investment were rent controls which effectively ended speculative building. A few weapons factories were converted to building prefabricated housing and some were quite successful in this activity.



During the years 1945-1948, over 1.5 million houses were built in Japan. Still, even today "doubling up" is a common phenomenon because there are more households than there are houses in Japan.

Overcrowding is the chief feature of housing in Japan. Although it is difficult to imply a causal relationship one way or the other, it must be remembered in connection with overcrowding, as mentioned above, that the Japanese have relatively little need for Western style furniture. Most rooms in Japanese residences are multipurpose rooms. Very few families have rooms that are used exclusively for sleeping. What a Westerner considers to be overcrowding will not necessarily be the same to a Japanese; conversely, overcrowding by Japanese standards is even more severe to a Westerner.

In 1941, a national committee defined overcrowding as being one of the following two conditions: either more than two persons per room or less than three tatami mats per person, with each child counting as one-half a person for this measurement. At that time, more than 50% of the population was overcrowded. The same committee laid down objectives for housing development in Japan. These were essentially copied from European lists, but the order of the items is purely Japanese.

1. Married couples should have a separate bedroom.
2. There should be a separate livingroom.
3. There should be 4.5 square yards of sleeping space per person.
4. Adolescent children of opposite sexes should not sleep together.

These objectives still hold today, and consequently most housing that is being constructed is of significantly larger size than the older houses in Japan. A higher quality of construction, however, is the chief housing want of the people today. Specifically, this means more durable structures, larger floor areas and coordinated appliances and fixtures.

Current housing demand is partially satisfied by government loans to private builders of housing for their own occupancy of 85% of the construction cost. In addition, there are government subsidized housing developments with minimum income level requirements. The availability of both programs, however, is far exceeded by their demand and they do



have a definite middle class bias. In 1951, which is about the point when this report begins in depth, 2.4% of the population still lived in what must be described as non-dwelling units (see Table 1).

Two social phenomena should be considered when discussing housing development in Japan. The first is the tremendous migration into urban areas (particularly Tokyo) after World War II. Second is the breakdown of the extended family system. Previously in Japan, several generations of one family lived together under the same roof. After World War II younger generations decided to go out on their own, thus increasing demand for separate dwelling units. These two phenomena have caused an increase in the demand for housing which far exceeds the requirements that would normally be projected by population increases.

Even after Japan became economically reoriented in the late 1940's and settled down to serious rebuilding, it was impossible to devote adequate attention to housing. In the first place, there was insufficient capital available for such developments as most capital went into industry. This pattern continues today, with the large city banks being more anxious to lend to industrial clients than to housing developers. Another reason was the absence of adequate government housing programs. Public housing, as we mentioned before, was unknown in Japan until the 1920's and even then the public housing efforts were not adequate. These two factors, when coupled together, produce a situation whereby housing accounts for only 2% of the national budget and only 12% of total investment spending.

In philosophical terms, what is occurring today is a renaissance of concern for the individual in Japanese society. Urban areas are being considered as homes for citizens, not just bases for industry. Modern housing standards are being developed and public housing programs are being expanded. The next goal is control of the upward spiral of land prices and building costs. According to the Ministry of Construction, building costs account for over half of the difficulty in erecting new residences in Japan. The building cost problem can be broken down into three components: wages, materials, and industrial organization. Wages in the construction industry are low, certainly according to United States



General Housing Characteristics

	All Japan	Tokyo
number of dwellings	24,197,900	2,967,520
number of households	24,920,400	3,116,060
number of household members	95,925,500	10,324,700
number of rooms per dwelling (avg.)	3.84	2.87
number of tatami per dwelling (avg.)	22.04	15.49
number of square meters of floor space per dwelling (avg.)	73.86	50.21
number of tatami per person (avg.)	5.56	4.45
number of persons per room (avg.)	1.03	1.21

Table 1





levels, but productivity is even lower. The amount of technology associated with each worker must be increased to the point where the productivity of construction workers approximates that of industrial workers. The second is the cost of materials. Wood, for example, is becoming so scarce that it is essentially an historical building item. Technology has not produced adequate industrialized materials for Japan, and one of the chief objectives of this decade is to produce proper artificial materials for housing construction. The building industry also has a very inadequate distribution system for building materials. There are numerous suppliers and jobbers operating between the manufacturer and the consumer. If some of these components could be eliminated and the distribution of building products rationalized, there is no doubt but that the cost to the consumer of these materials would be significantly reduced. In similar fashion, the building industry itself is poorly organized. There are a great number of small builders. There is little vertical integration and significant over-emphasis on subcontracting. Only a few of the very largest companies have been able to integrate their building activities under one corporate roof.

All of the aforementioned problems come into play only after a building site has been acquired, and land acquisition is the second chief problem in housing development in Japan. Basically, land is very expensive and there is little available. There are few incentives in a rising market that will induce an owner to sell his land when the expectations of increased profits are so good. When land can be made available, it is often done so in small parcels. From a public point of view, it becomes very difficult, if not impossible, to introduce social overhead capital in an effective scale. This is particularly true in the case of transportation systems (both highway and rail), and sewage systems. The net result is that in Japan there is a great tendency towards urban sprawl as the demand for separate dwelling units and the unavailability of adequate sites upon which to build them force the development of scattered suburban areas outside the fringes of the major metropolitan areas. Often, these suburban areas are inadequately serviced with public facilities.



The present intensity of housing construction can be described only as phenomenal. Japan produces 15 dwelling units per 1000 population per year. By contrast, the U. S. produces somewhere between 6 and 7 dwelling units per 1000 population per year. Once it was decided to go ahead with a large-scale housing development program, the amount of national income spent on this effort has risen steadily. In 1955, Japan spent about half of what the United States spent on housing as a percentage of gross national product. Five years later, these percentages were equal. Now Japan spends almost three times as much, again in terms of percentage of gross national product, as does the United States (see Chart I). In absolute terms, the number of houses built has grown steadily (with the exception of 1948-1951) from 236,000 units per year in 1945 to 1,573,000 in 1969. The development of these homes cost \$10 billion, which means that Japan spends more on housing than any other nation in the world. Whereas the growth in housing construction in Japan has been steady since World War II, the United States reached its present level of housing construction within five years after World War II and the rate has fluctuated around that level ever since. At this point, Japan and the United States have essentially the same number of housing starts per year (excluding mobile homes), even though the population of Japan is about half that of the United States (see Charts 2 and 3).

The upward spiral of land prices can be effectively illustrated by two tables produced by the Japan Real Estate Institute. The first one shows the price indices of classified urban land in Japan. Between 1955 and 1968, the average price of classified urban land increased tenfold. Although the rate of price increases from year to year has fallen off recently and reached an equilibrium position, it is presumed that the rate of increases has again shown a sharp increase during the last two years. During the same thirteen year period, however, wholesale prices remained relatively constant. The net result is that the relative increase in land prices when compared to wholesale prices is only slightly lower than the tenfold figure previously mentioned. In fact, it is 9.85 (see Table 2).



EXPENDITURES ON RESIDENTIAL CONSTRUCTION AS A PERCENTAGE OF G.N.P.

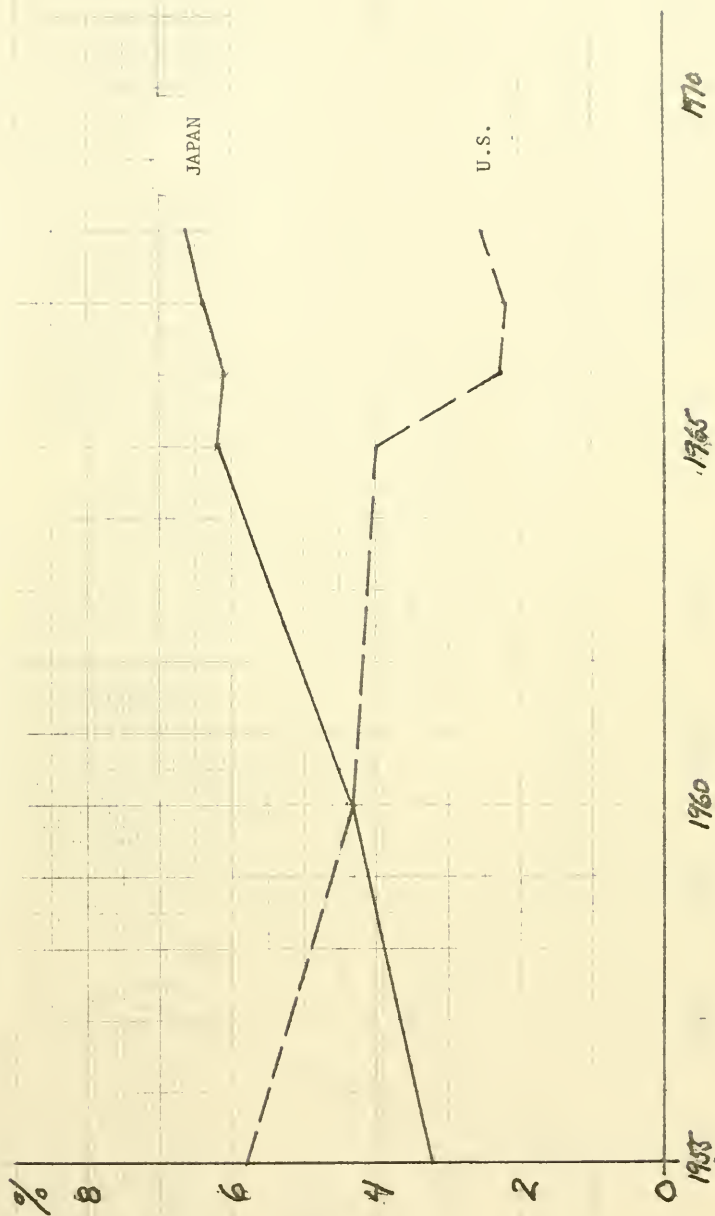


CHART 1



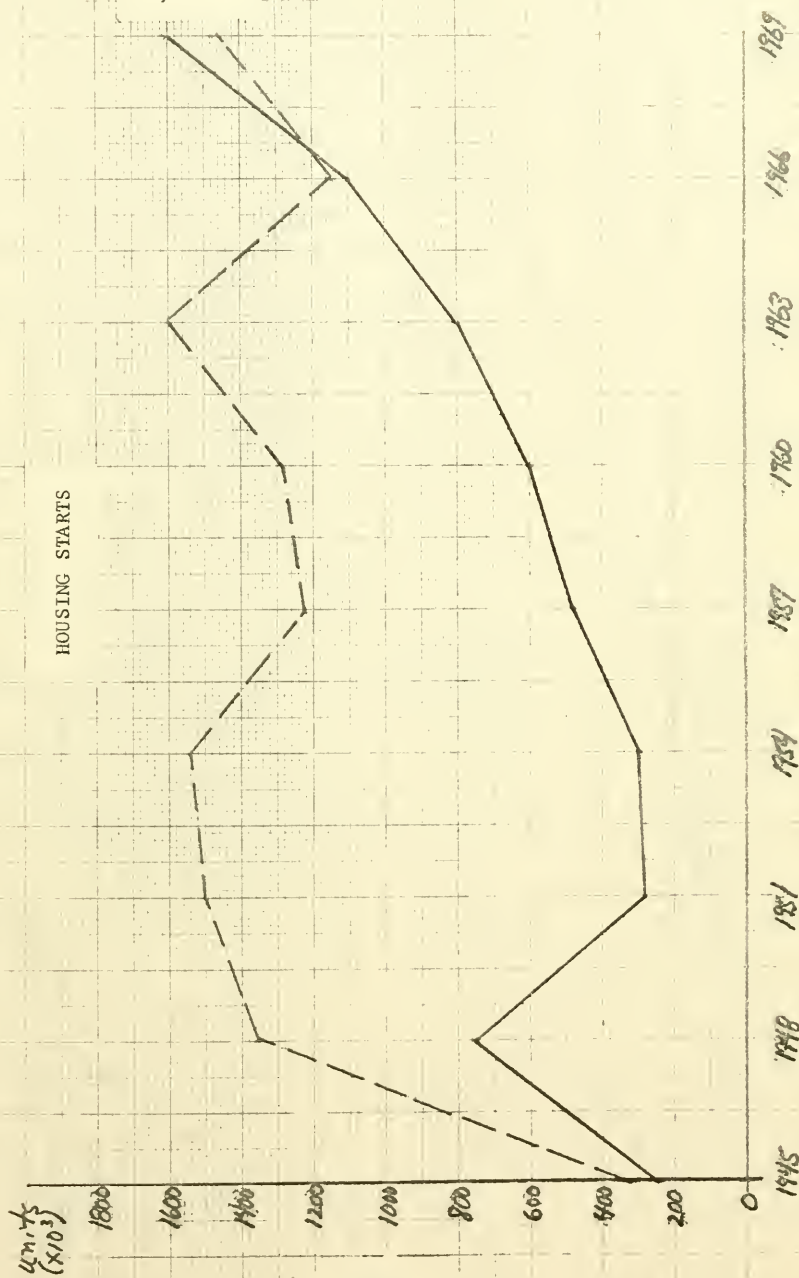


CHART 2





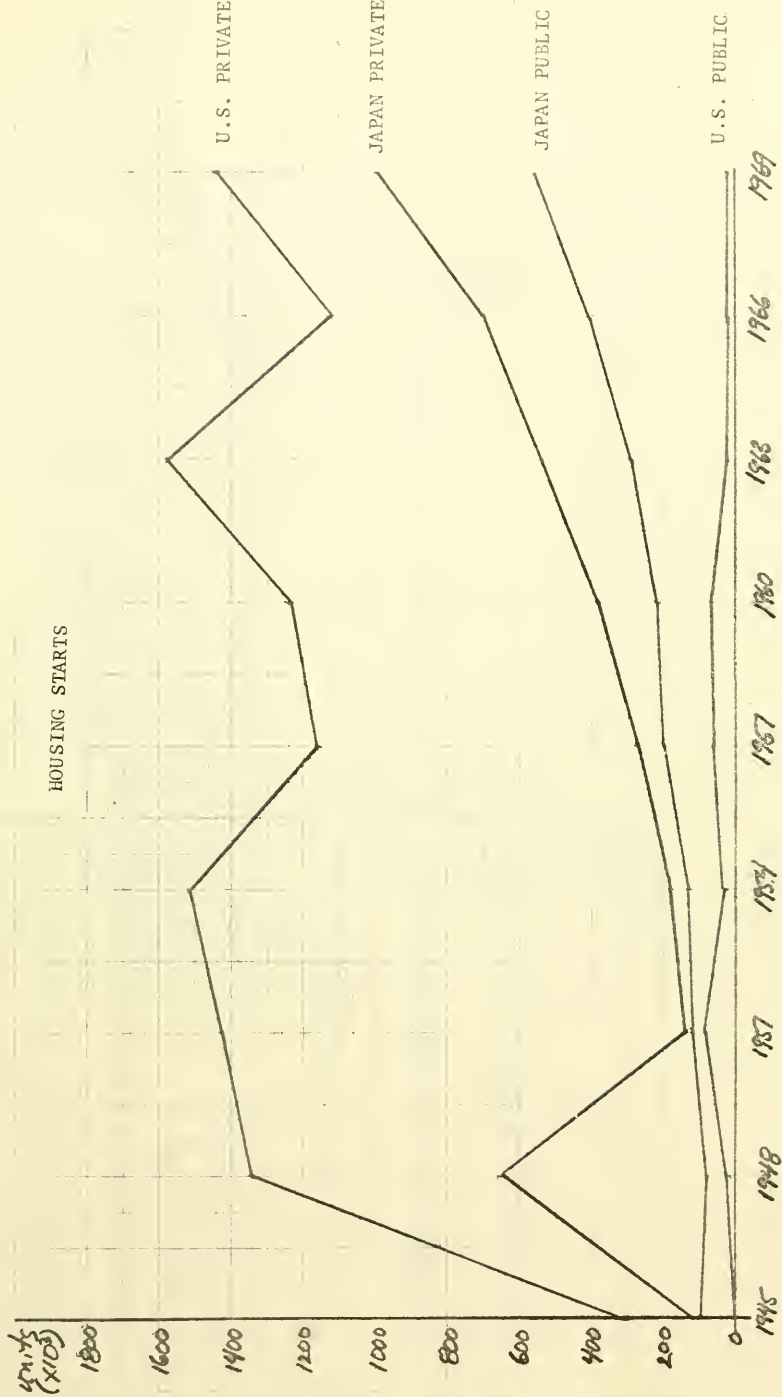


CHART 3



TABLE 1. PRICE INDICES OF URBAN LAND  
IN JAPAN

(Mar. 1955 = 100)

Year	Index of Urban Land Price in Japan (A)	Wholesale Price Index released from The Bank of Japan (B)	$\frac{A}{B}$
1955, Sept.	106	98.6	1.08
1956, Mar.	114	100.5	1.13
" Sept.	127	105.7	1.20
1957, Mar.	146	107.6	1.36
" Sept.	162	105.3	1.54
1958, Mar.	178	100.7	1.77
" Sept.	197	97.7	2.02
1959, Mar.	220	99.5	2.21
" Sept.	248	101.0	2.46
1960, Mar.	280	101.8	2.75
" Sept.	330	101.2	3.26
1961, Mar.	399	102.0	3.91
" Sept.	467	103.3	4.52
1962, Mar.	507	101.6	4.99
" Sept.	551	100.1	5.50
1963, Mar.	594	101.9	5.83
" Sept.	633	102.9	6.15
1964, Mar.	677	102.8	6.59
" Sept.	726	102.8	7.06
1965, Mar.	768	103.6	7.41
" Sept.	789	103.5	7.62
1966, Mar.	808	105.4	7.67
" Sept.	832	106.3	7.83
1967, Mar.	875	107.8	8.12
" Sept.	929	108.1	8.59
1968, Mar.	994	109.2	9.10
" Sept.	1,073	108.9	9.85

TABLE 2. PRICE INDICES OF CLASSIFIED  
URBAN LAND IN JAPAN

(Mar. 1955 = 100)

Area Year	Highest Price Land	Commercial Area	Residential Area	Industrial Area	Average of Classified Areas	Increased Rate of Index against the Preceding One
1955, Sept.	104	106	106	105	106	6 %
1956, Mar.	114	114	114	113	114	8
" Sept.	129	128	127	127	127	11
1957, Mar.	143	146	144	149	146	15
" Sept.	157	163	159	166	162	11
1958, Mar.	172	175	177	181	178	10
" Sept.	184	193	198	201	197	11
1959, Mar.	209	216	219	225	220	12
" Sept.	243	244	245	256	248	13
1960, Mar.	283	282	269	293	280	13
" Sept.	341	332	310	352	330	18
1961, Mar.	400	385	371	449	399	21
" Sept.	469	446	430	536	467	17
1962, Mar.	506	478	469	589	507	9
" Sept.	542	513	510	646	551	9
1963, Mar.	582	561	542	701	594	8
" Sept.	617	590	576	755	633	7
1964, Mar.	654	628	617	812	677	7
" Sept.	687	680	661	864	726	7
1965, Mar.	699	712	707	911	768	6
" Sept.	718	736	726	928	789	3
1966, Mar.	742	759	751	939	808	2
" Sept.	769	789	781	948	832	3
1967, Mar.	815	838	826	982	875	5
" Sept.	877	890	891	1,022	939	6
1968, Mar.	941	954	962	1,083	991	7
" Sept.	1,013	1,032	1,048	1,153	1,073	8

Table 2



Soon after it was realized that Japan could do something to alleviate its dismal housing condition, the first five year housing construction plan was implemented. This occurred in 1966. Under it, a total of 6,700,000 units were to be built, with approximately two-thirds coming from the private sector and one-third from the public sector. This first five year plan closed out at the end of 1970. It is anticipated that this goal of 6,700,000 units was achieved or even slightly exceeded. The actual housing needs of Japan, however, far exceed the amount that has been provided through this five year plan. Even though the goals that were set proved to be realistic, they also proved to be inadequate.

For these reasons, a second five year plan is being developed. The target has not yet been released, but it is anticipated to be in the area of 9,500,000 units, with roughly the same one-third, two-thirds split between the public and private sectors. As pointed out by Professor Ezra Vogel of Harvard, the net result of these two programs will be that by 1975, over 60% of all Japanese people will live in new homes.

Although not specifically part of the five year plans, progress has been achieved in two ancillary areas. The first is in the amount of financing available to private home builders. As we shall see later, there has been a dearth of funds available for the private housing development. This amount, small as it was, had been increased by about 80% during the one year 1967-1968 by the easing of the domestic money supply. Special tax treatments for housing have also been developed. These include 50% exemptions from property taxes on new construction for three, five, or ten year periods. There is a special accelerated depreciation available to the builder of rental housing which amounts to 200% or even 300% in special cases for the first five years. There is also a credit against an individual's income tax amounting to 4% of the amount saved toward the purchase of owner-occupied housing, with an upper limit of 10,000 yen per year.

The first five year plan has enabled Japan to make objective assessments of its efforts in the housing development area. In view of



these evaluations, several non-quantitative goals have been set out. These are as follows:

- a. To improve the standards of housing, especially in urban areas;
- b. To improve location of housing with regard to commuting distances;
- c. To encourage the construction of rental houses by land owners, e.g., farmers in metropolitan areas;
- d. To reinforce the financing of private housing and housing loan insurance;
- e. To extend the supply of public rental housing; and
- f. To rationalize the housing development industry.

When these objectives are compared with those set out in 1941 which were, as we noted, simply copies of the European objectives, it is clear that Japan is taking a much closer look at its own housing development issues. Japan appears to be effectively diagnosing its own problems and is applying specific measures to counter some of these contemporary difficulties.

When R. P. Dore wrote City Life in Japan in 1958, he was able to describe a "typical Japanese home." Today this is no longer possible. People in Japan have adopted a variety of housing styles and it simply cannot be said that one pattern is typical of the entire country. The house that Dore described was a two-story unpainted wooden house with about 10 mats per floor. It had a relatively uniform design and these could be found throughout all of Japan. The post war building boom, however, has given rise to a variety of new styles. Some of these are developments of the ancient Kyoto townhouse, or copies of the North American ranch house which was based originally on Japanese designs. Others are large private apartment houses, smaller versions of which have existed in Japan for many years, or the relatively new Japan Housing Corporation ferro-concrete apartment buildings. The most universal development is the introduction of what is called the dining-kitchen, the floor of which is typically covered with tiles or linoleum as opposed to





tatami in the rest of the house. At the same time, there is a tendency away from multi-purpose rooms, so that now one finds a few bedrooms, study rooms and livingrooms as well as general purpose rooms.

Throughout history the Japanese people have attempted to rationalize their desires for retention of housing concepts which are indigenous to Japan with those which they wished to import from the West. Perhaps at no time has the conflict been so marked as it is at the present. Japanese houses have always borne a sense of tranquility and harmony that Westerners have admired, and sometimes copied, but there seems to be no means by which these concepts can sustain the onslaught of industrial production techniques.

To appreciate the conflict, the Western reader must be given some idea of the essence of a traditional Japanese house. In its modern form, it has traces of two earlier styles -- the samurai home and the tea-ceremony house. Both of these were retreats of nobility, and once their design became diffused among the population, vulgarity and imitation inevitably crept in. Yet out of these, several fundamental concepts have been retained. The first is the lack of identifiable rooms with specified purposes such as bedrooms or diningrooms. Even large country estates which could have afforded the luxury of such single function isolatable spaces never employed them. Instead, activities took place in whatever space was most suitable for the purpose as differing needs arose. For example, large spaces could be opened to accommodate a number of dinner or overnight guests. In pleasant weather, an outside room could be used as a study during the day as well as the setting for a family meal. The force of this tradition is emphasized by the fact that even today the Japanese language has no word which means "room" in the Western sense. The closest approximation "ma" which is more properly translated as "space."

Another concept is that of harmony with nature. Eastern philosophy, in sharp contradistinction with the Judao-Christian tradition, emphasizes life in accordance with nature rather than conquest of it.



Consequently, natural materials have long been favored by the Japanese. These include native woods such as unfinished pine, cypress, cedar, and bamboo, as well as straw and clay. Also, the temperate Japanese climate was invited into the house through large panels which could be slid wide open during the day.

Modularity of components is a fundamental characteristic which has survived until today. The basic building unit is the tatami which is about 3 ft. x 6 ft. in size. A fusuma screen is exactly the same size as one tatami and all other components are based on the tatami dimensions. One result of this modular system is that anyone could design a home to his individual specifications without the help of an architect. The owner could simply discuss his preferences with the builder who could accommodate his desires by adjusting the number of posts and dividers to enclose the new spaces. Even though this system gave the individual a certain amount of flexibility in design, it tended to produce a somewhat monotonous structure. Consequently, the Japanese sensed a need for asymmetry in design and frequently employed a limited number of sharply contrasting elements to break up this monotony. Examples are unfinished posts and stone paths laid in irregular patterns.

Against this background, Western democracy is entering house design. This means that every member of a household, and not just the master, is entitled to his own private space. The only way that this can be achieved is by the introduction of separate rooms with thick walls and doors. No longer can spaces be expanded or contracted as the need arises. Once everyone has his own space, it takes on specified functions such as sleeping and studying. A result is a parallel trend away from movable furniture to fixed components such as beds, chairs and desks. Western furniture is also suited to a more active life and it is frankly easier to get up from a chair than from the floor. Western activity is admired and Western furniture is suited to this concept. At the same time, the woman's role has become more prominent and the kitchen has been brought out from the back of the house to the center. This means that it is more on display and Western style appliances are now in vogue.



Once the kitchen became a more pleasant place it made sense to eat there and the dining area with Western table and chairs became prevalent.

At the same time as these desires for Western rooms and furniture caught hold in Japan, the demand for urban homes increased with tremendous rapidity. Japan still has not solved its urbanization problems nor is it likely to in the immediate future. This increased demand for dwelling units caused a shift in emphasis from style to quantity. Now the beautiful handmade wooden components are unaffordable luxuries and poured concrete has become the chief building material. Individuality in design is unattainable except by the most wealthy and all others must accept either the total uniformity of public dwellings or the packaged variations of the private developers. From a straight financial point of view, it is impossible to build even a modest traditional home anymore. Artificial materials, factory production and uniform design are the current rule. Unfortunately, the fundamental concepts of harmony, flexibility and modularity seem to be doomed under the pressures of economic growth, urbanization and, ironically, Western democracy.

The government of Japan has produced what may be the most complete set of housing statistics available for any country in the world. The presentation of some of these statistics in graphical form leads to interesting observations. Chart 4 depicts the number of tatami per unit. Four curves are depicted, one for houses which the owner occupies himself and the others for rental units which are owned by the government, private owners or the occupier's company. All four curves show a remarkably modal distribution, in that the amount of space peaks out with relative uniformity. In fact, with the exception of owner-occupied houses, there is very little difference between the modal size of the different categories of rental units. For example, the modal unit for privately owned apartment houses is very clearly 9-12 tatami per dwelling unit. It appears to be slightly larger, somewhere around 12, for publicly owned apartments and somewhere around 15 for company-issued homes. As can be expected, the distribution is far wider for owner-occupied houses, because these would belong to individuals in the highest income brackets



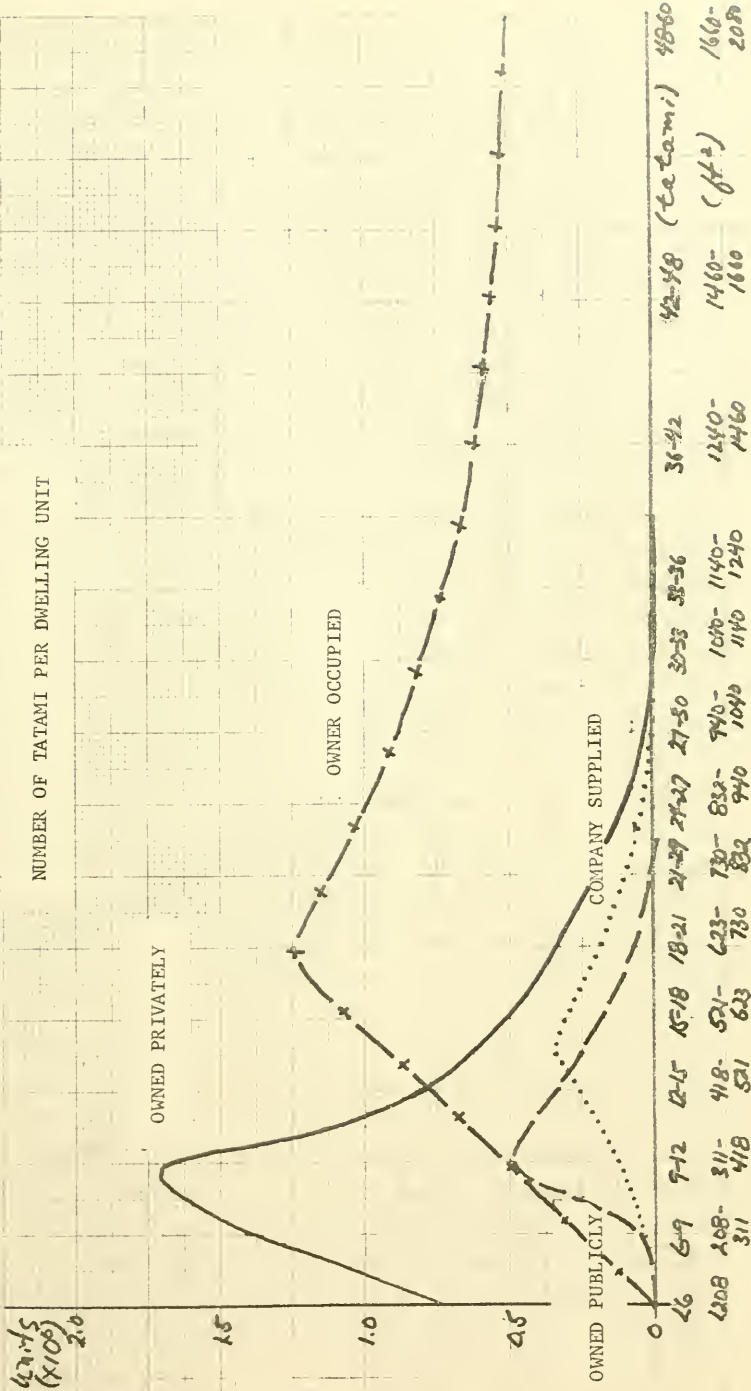


CHART 4





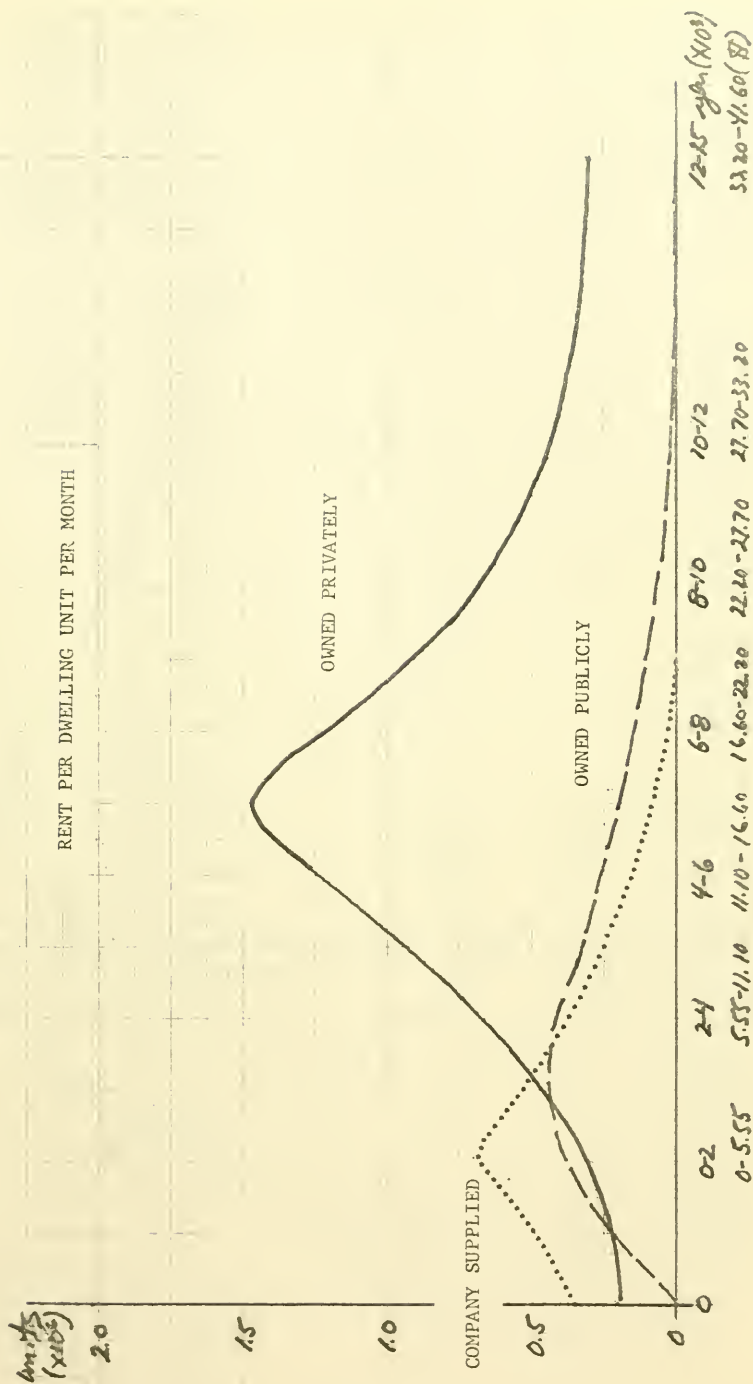
It can be said, however, that the typical Japanese dwelling is about 12 mats (210 square feet) in size.

The monthly rentals per dwelling unit show similar modal distributions, even though the variance in these cases is somewhat larger than in the case of space (see Chart 5). But again, as could be expected, the modal rent paid for privately owned dwelling units is the highest. What is interesting to note, however, is that the modal rent for the company-issued houses is significantly lower than that for publicly owned units. In these particular cases, the modal rent for company-issued houses lies somewhere below 2,000 yen per month, whereas the modal rent for publicly owned housing appears to lie in the area of 2,000 yen per month. The privately owned rentals seem to be about 6,000 yen per month, with, of course, a very large variance in the rental distribution.

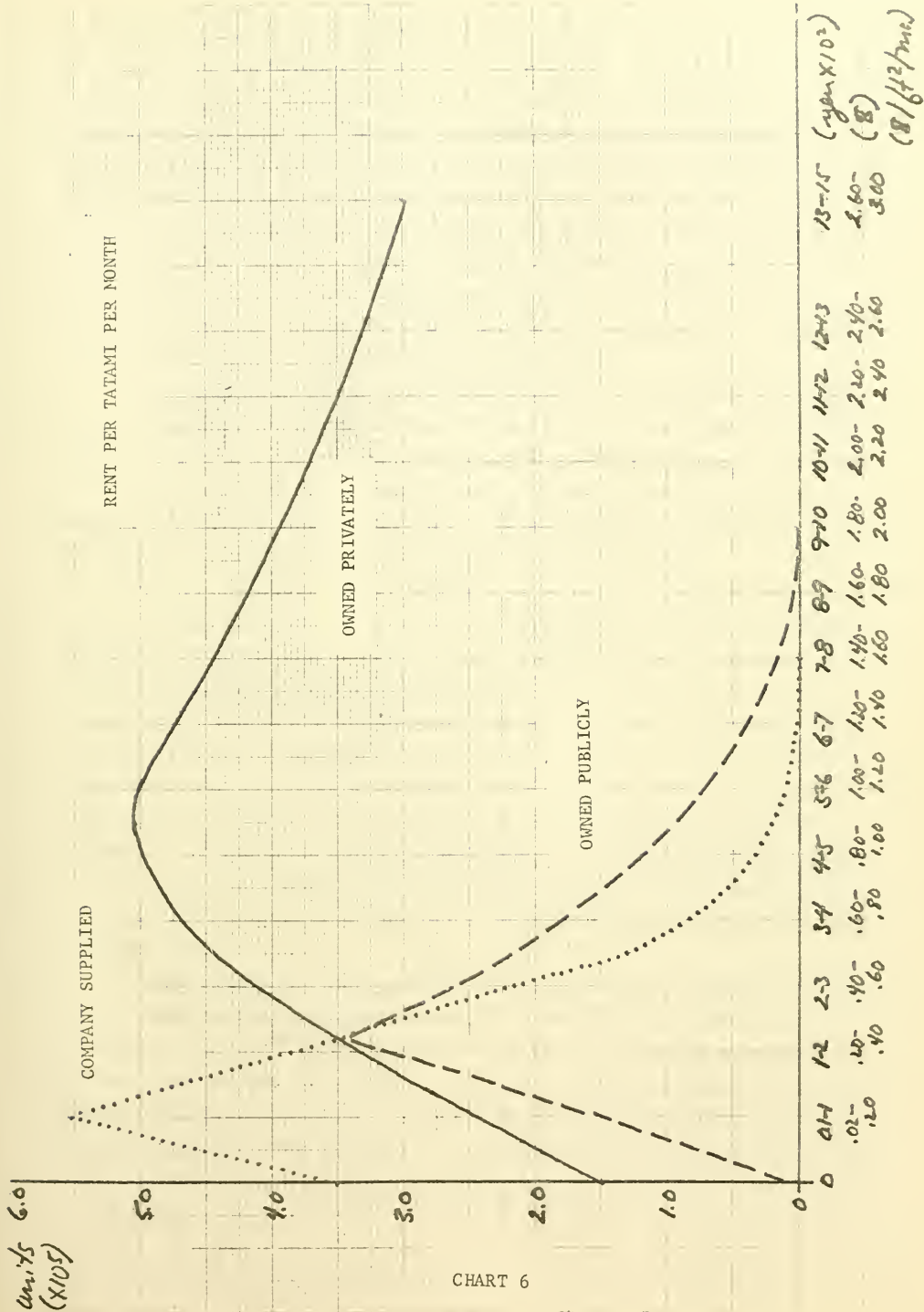
When one puts these data together, the rent per tatami per month can be seen in Chart 6. Here the effect of systematized planning of housing development is depicted quite clearly in that in both the company-owned and publicly owned apartment units, the distribution is again sharply modal with the rent per tatami per month for company-owned houses being about half that of the publicly owned houses. And again, there is a very wide, less uniform distribution for the rents that are paid for units in privately owned apartment dwellings. In addition, there appears to be no effective upper limit to the rents that are paid by the tenants in privately owned apartment buildings, whereas there are fairly well defined upper limits for both the publicly owned and company-issued houses. The implications of all three of these charts taken together, is that the best deal available for a Japanese tenant is company-issued housing. Company housing is almost as spacious as the owner occupied housing, and yet it has the lowest rent per unit floor area of all.

The advantages of being provided with company housing or in purchasing publicly owned housing are obvious when prices are compared with wages. It is difficult to say just what an inexpensive house costs in Japan, but a conservative estimate would be 6 million yen for a small prefabricated house on a small lot about 1 1/2 - 2 hours commuting dis-











tance from the center of Tokyo. The average household income in Japan (wages plus bonus) is currently about 1 million yen per year. This means that for an average worker, a home purchase represents a commitment equal to six times his annual income. Furthermore, since most banks will not loan him an amount greater than three times his annual income, the average worker would have to save up in cash three times his annual income. In other words, only the upper middle and upper classes can even afford to buy a home.

Contrast this situation with that in the U.S. where the equivalent of the Japanese house costs no more than \$20,000. The average household income is now approaching \$10,000 so that this purchase represents a commitment of only two times annual earnings. Down payments are rarely more than 20% in such cases (10% with federal assistance), so the amount saved must equal only a few months' earnings.

It is clear that in Japan, homeownership is a privilege enjoyed by fewer people than in Western countries. One reason for this is the lack of competitiveness in the homebuilding industry. When all purchasers are wealthy, the sellers can distinguish their products on bases other than price. Purchasers have been just the wealthy ones in part because developers have concentrated on land instead of structures. Land in house lot quantities is a liquid commodity in a rising market in Japan. It has made complete economic sense for the developers to buy land wholesale, develop it into lots according to a master plan and sell them off, leaving the building problems to the purchaser. Since land is such a large factor in the cost of a home, the bulk of the profits are made at the early stages.

Most Japanese development companies feel that the upper income home market has been saturated and that they will have to devote their attention to the lower income purchaser in order to realize substantial profits in the future. This means controlling costs and lowering prices to large degrees. It is interesting to note that Levitt Building Systems, the leading force in the production of cost controlled private homes in the world, is just now entering the Japanese market. Why wasn't Levitt or





another similar firm in Japan earlier? Their technology was not needed until now.

Factors such as technology may be very effective in decreasing the costs of constructing the house itself, but are of no effect in reducing land prices. Land costs can be controlled by either the government or the developer. The government can institute price controls or any one of a variety of less drastic solutions, several of which are being utilized now. For example, Osaka purchased enormous quantities of land to build Senri Hills and thus provide building sites at costs lower than those that would have been provided by private developers. Municipalities could engage in "land bank" operations by buying land and setting it aside until the need for it increases. In a sense, this is what Osaka is doing with the development of Senboku. A much simpler solution would be via the rational purchase of smaller development sites. Right now, the Japan Housing Corporation and metropolitan housing bureaus buy land for residential development wherever it is cheapest. Such an overemphasis on costs is leading to an irrational land use pattern which will only aggravate the situation in the long run.

One man who has an almost unique concern for and understanding of the urban location/land use problem is an architect named Akina Inadomi. He has developed what may be the world's most advanced computer based system for the analysis of present and projected land uses. His work has been accepted somewhat, as the Tokyo Municipal Government has awarded him contracts to analyze three of its principal neighborhoods. But his ideas must be accepted on the national level, or at least by other municipalities, before the problem is allowed to compound itself drastically.

On a smaller scale, there seems that much can be done to make more effective use of individual development sites. Right now private Japanese developers opt for the easy way out and just lay a grid on a newly acquired tract to map out blocks and lots. This practice was abandoned long ago by most foreign residential planners in favor of a curvilinear street plan. Now, the rising land costs coupled with an



increasing demand of suburban home purchasers for the amenities that subdivisions promised but never produced have caused the creation of "planned unit developments." These have been accepted on the Continent for some time now, but are only now gaining acceptance in the United States. In a planned unit development, the objective is to cluster the homes together in order to free up larger tracts of land for use as green space, parks or playgrounds. It would seem that the use of such development would be most natural for Japan, yet Kyoshi Seike, a prominent architect, has not been able to convince a single major developer to attempt a planned unit development. It is known that such developments of cluster homes can actually provide more privacy at less cost than can detached dwellings, but still they are untried in Japan. Developers equate these to cheap row houses rather than with stylish Western housing, and it is interesting to note that the origin of this form of housing is actually Japanese, dating back to early Kyoto town houses. Their answer is always based on pessimistic market projections and the rising demand for Western suburban styled homes. If Japan devotes her best real estate talent to the creation of more and more "new towns" composed of bulky detached houses, the result will be a tragic waste of human, financial and physical resources. Seike, who sees that the replication of U. S. homes in scaled-down version is wrong, replies that the Japanese developers must come to realize that a Cadillac is a Cadillac and a Datsun is a Datsun. America, which has had land to squander on suburbs and roads, can support Cadillacs and large detached houses. Japan cannot and the Datsun is much more amenable to her environment. It does not mean that the Datsun, or more compact houses, are inferior goods.

The next chapter is devoted to an analysis of the public and private housing developers in Japan. Special attention is given to the Japan Housing Corporation which is one of the world's largest developers of low and moderate income dwellings.



## CHAPTER II

### CONSTRUCTION OF HOUSING

#### A. Public Developers (Japan Housing Corporation)

Japan Housing Corporation (JHC) is a public organization established with funds provided by the national and local governments, as well as private sources. It is the national agency to execute the government housing program and its activities are unhampered by the regulations of local jurisdictions. It supplements the activities of municipal housing authorities which provide shelter for the lowest income families.

JHC headquarters are located in Tokyo. There are five branch offices, two in Tokyo, and one each in Osaka, Nagoya and Fukuoka.

The five main activities of the JHC are:

1. To construct and to manage rental dwellings;
2. To construct dwellings for sale;
3. To conduct urban renewal programs;
4. To develop large areas of land; and
5. To build public and community facilities for the benefit of its tenants.

In addition, JHC has three specialized agencies:

1. The National Capital Region Land Developers Development Headquarters, which provides building sites in and around Tokyo;
2. The Minami Tama Development Bureau, which has as its primary purpose the development of a large suburban area of Tokyo into a new town; and
3. The Academic City Development Bureau, which is responsible for the building of a research and educational center north of Tokyo.

The funds of the JHC come from four sources:

1. The funds at no interest which are furnished by the national and local governments;
2. The funds from the national government which bear a below-market interest rate;



3. The funds at the market interest which are provided by private financial institutions; and
4. Its own bonds.

Since its establishment in 1950, the Japan Housing Corporation has constructed more than 300,000 dwelling units for rent and more than 200,000 dwelling units for sale. The dwellings for rent are called "danchi." Danchi are typically four - five story apartment complexes of ferro-concrete construction. The floor space of a danchi dwelling unit is 550-650 square feet, about the national average for all dwellings. Danchi usually include ancillary facilities such as shops, supermarkets, banks, post offices, local government offices and schools of all levels from nursery through secondary.

Dwellings which are constructed on high-price urban land are usually developed in conjunction with the owner of the land, and the lower floors may contain shops and offices which the developer can rent out for his own profit. The upper floors contain moderate income dwelling units. Typically the building site is leased by the JHC from the private owner. In a few instances the JHC also constructs large high-rise complexes in Tokyo and Osaka, where the price of the land requires the construction of a larger number of units on a relatively small site.

Of the dwellings for sale, three different plans are available for the purchase of these units which are typically owned in condominium fashion. The main difference among the plans is the amount of down payment. The three plans are called dwellings for ordinary sale, dwellings for special sale and dwellings for specified sale. The ordinary plan calls for immediate payment of the total amount or a large down payment and the balance to be paid in small installments over a period of 20 years. The dwellings for special sale provide a means for the average income citizen to purchase his own apartment. This plan requires a down payment of about 300,000 yen and the balance to be paid in equal installments over 25 years. The specified sale plan is designed for companies who wish to provide housing for their own employees. In this case the JHC acts as a turnkey developer by developing a site for the purchasers according to their own specifications.





The rent that a tenant pays is calculated according to a rather complex formula instead of being derived from market rates (see Table 3). Rents are set for new tenants each year, but once the rent has been established it is not changed for the entire length of time the tenant continues to occupy that particular apartment. The rents that were set in 1969 for a three-bedroom apartment were 15,246 (\$42.50) yen per month.

The JHC also manages its own dwellings. One of its chief problems is selecting the tenants for a dwelling-unit because there are always more prospective tenants than available units. The nationwide average ratio of potential tenants to available units was more than 15 in 1967. This has fallen from a peak of about 40 in 1963, which is evidence of the effect that the JHC has had on the availability of low to moderate price apartments throughout Japan.

The JHC is also heavily involved in the development of building sites, i. e. , the land itself, and then allowing private individuals or corporations to build houses according to their own desires. Although the JHC has been involved in the development of both industrial and residential sites, the amount of land being developed for industrial activity has fallen off considerably from a peak reached in 1963, whereas the amount of land developed for residential use has been rising rather steadily from 1958 on.

A description of the JHC development in Chiba Prefecture, just to the east of Tokyo, will give the reader a good introduction to its operation. This development is large both in terms of housing area and site coverage. Land in Chiba is relatively easy to acquire because this area has not been under the same intensive development as Tokyo. The development in Chiba has all three types of JHC structures on it: apartments for rent, apartments for sale, and lots for sale for private development. The apartments for sale and the apartments for rent are essentially identical, but are not mixed in the same structure. These structures are grouped into clusters, so that there is a group of buildings with apartments for rent and another with apartments for sale. A third area contains the lots to be sold for the development of single family houses.



Land in the Chiba danchi was sold at 3,500,000 yen per 200 square meter lot. This is a price of 175,000 yen (\$50) per square meter, which is somewhat higher than typically found for land at this distance from Tokyo station. It was, however, a rather desirable area and the land was able to command a premium in price. The houses that could be built varied from 250,000 yen per tsubo for a ferro-concrete house down though 150,000 yen per tsubo for a wooden house and 120,000 yen per tsubo for a prefabricated house. Figuring an average of 25 tsubo per house, which is a little more than twice the size of the average JHC apartment, total construction costs work out to 6.25 million yen for the ferro-concrete house, 3.75 million yen for the wooden house, and 3.0 million yen for the prefabricated house. When the 3.5 million yen land cost is added on, total costs become 9.75 million yen for a ferro-concrete house, 7.25 million yen for a wooden house, and 6.5 million yen for a prefabricated house. This is to be compared with a 2.5-3 million yen per year annual income of most of the residents, which, of course, is considerably above the national average. It should be mentioned that if an individual were to buy a similar lot from a private developer he would pay at the very least 5 million yen; the JHC lot is priced considerably below the private market. As a general rule, a person can get a prefabricated house and lot from the JHC for 6 or 7 million yen. If he goes into the private market, he's got to pay somewhere at least 8-10 million yen for a similar unit.

The overall plan of the development is similar to an American subdivision. Rectangular lots are arranged along side streets with very little traffic. Houses are set back a substantial distance from the street. Because people built these houses according to individual preferences, they varied from one to another. The 'tract' atmosphere of rows of identical houses that one sees occasionally in the U.S. was absent. As is typical in developments of this nature, there was very little greenery. Consequently, there is very little shade in the area, which makes it somewhat uncomfortable in the summer.

As mentioned above, apartments for rent are collected in a cluster of buildings, perhaps six or eight separate structures, centered



around a large green area containing sitting space for adults and play areas for children. The buildings are typical of JHC structure, four to five stories in height and of ferro-concrete construction. Each has one entrance in the middle of the building leading to the stairway. There is one apartment on each side of the stairway on each floor, two apartments per floor, for a total of eight to ten separate apartments per building. The buildings are rectangular solids, rather narrow in shape, and only one apartment in width.

The typical pattern is for these buildings to be set up like block oriented towards the south. The Japanese are extremely sensitive about the orientation of buildings as sunlight is particularly important. It must be remembered that except in the most northern areas of Japan, the buildings contain no central heating, so that sunlight is an important source of warmth. In addition, it is common practice for the Japanese to air out their bedding every day, and to be able to put the bedding out over the back railing to face the sun for a few hours every day is a great advantage.

There are also traditional reasons for the existence of a southerly orientation which are based in part upon this need for heat and, secondly, the desire to keep the toilet facilities in the cool, northern quarter of the house for sanitary reasons. With the advent of modern plumbing and some form of indoor heat, these reasons become less important. In fact, I would think that it would be worth considering the installation of central heating in these units simply to allow diversity of orientation. Since the buildings have to be stretched out a considerable distance to prevent one building from shading the next, it might even become possible to make more effective use of the land. Some of the complexes that have been built in more recent times have actually avoided the uniform southerly orientation, but those buildings that are oriented on a north-south axis so that the back of the building faces east or west are considered to be less desirable units.



The individual dwelling units are quite uniform and vary little from one building to the next in a complex and from one complex to another throughout Japan. There are six or seven basic types of apartments, ranging from one general purpose room with a kitchen to four general purpose rooms with kitchens. However, these two extreme categories have been discontinued in recent years and development is concentrated on the four basic types. One is the one general purpose room with a dining kitchen. The second is two general purpose rooms with a dining kitchen. The third is three general purpose rooms with just a kitchen, not a dining kitchen. The last is a three general purpose rooms with a dining kitchen. Again, there are very few units of the first category constructed. Most units are of the last three varieties, generally referred to as 2DK, 3K, and 3DK. They are built in approximately equal percentages (see Table 3).

It must be remembered that the "general purpose" nomenclature is quite meaningful since the Japanese typically use the same room for daytime activities as well as sleeping. (See Chart 4) The bedding is rolled up and stored during the day after its daily airing, and many activities can take place in the room before it is converted once again to sleeping quarters. This is possible only when the floor is made out of tatami and the bedding consists of futon. There is, however, a definite trend among the younger Japanese to utilize Western furniture in the form of couches, chairs, and beds. None of these mix very well with the straw tatami mat floor. For one thing, their heavy weight and sharp legs are very hard on tatami, and for another, they prevent the multi-purpose function of the room from coming into play. Although it was once common to have just one room done in Western style, now one frequently sees more than one room so decorated. These small apartments can become extremely crowded with furniture. The problem is the more Western Western living a Japanese can afford, the less comfortable in terms of space utilization his living quarters become.





### Calculation of Rent (1969)




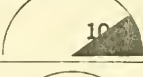
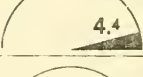
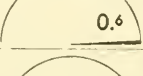

Classification	Amount	Percentage
Equivalent of Land Price	2,902	
Public Taxes	2,378	
Depreciation	7,420	
Cost of Repair	1,627	
Management Fee	678	
Insurance against Loss	90	
Security Fund	151	
<b>Rent</b>	<b>15,246 yen</b>	<b>100%</b>

Table 3



**The Percentage of Housing Projects**

fiscal year model	'60	'61	'62	'63	'64	'65	'66	'67	'68
1 K	—	1.7	—	—	—	—	—	—	—
1 DK	23.9	31.7	19.7	12.4	5.6	0.2	—	0.8	4.2
2 K	8.0	12.0	10.3	6.5	—	—	—	—	—
2 DK	38.4	35.2	26.2	32.8	45.2	38.8	28.9	34.4	35.7
3 K	23.1	16.5	37.6	40.3	29.7	35.2	40.5	41.5	34.9
3 DK	6.5	2.6	6.2	8.0	19.4	25.8	30.6	23.3	25.2
4 K (and over)	0.1	0.3	—	—	0.1	—	—	—	—

Table 4



There is, along with this desire for Western living, a desire for privacy as the social role of the individual expands. As a result, the Japanese are willing to make tradeoffs in space, light and air for additional privacy. Since no room is equipped with a door that could be considered soundproof, partitions are usually effected with portable closets. Each individual can now have his own space, out of sight but not of sound of others, which will enable him to do what he wishes, in a somewhat heightened state of privacy.

Almost all JHC residents have incomes of less than 5 million yen. Most of them were just above the national median, earning 1-3 million yen per year. The average age of a JHC rental tenant is 28, and the average age of the resident who had purchased his own house is 38. The size of family was 3 people per household in the rental units and 3.5 people per household in the purchased dwellings.

At present, there is no upper limit on the income of the residents. The increased demand for apartments of this type may force the setting of income limits and require the tenants either to pay a higher rent or to move on. This, of course, is the exact problem that the United States has been faced with. Here we have generally taken the latter approach and perpetuated the unnatural social mix of public housing. Modifications are now being introduced into public housing plans to allow people with higher incomes to stay on to provide a more sensible mix of income levels throughout the unit but require them, at the same time, to pay a higher level of rent.

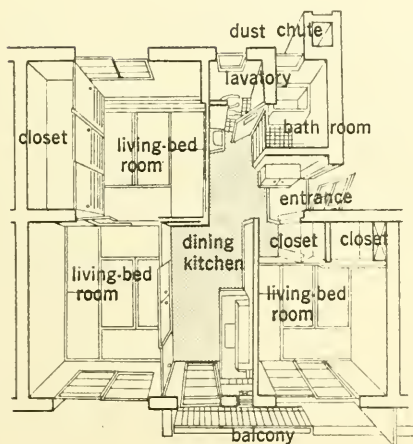
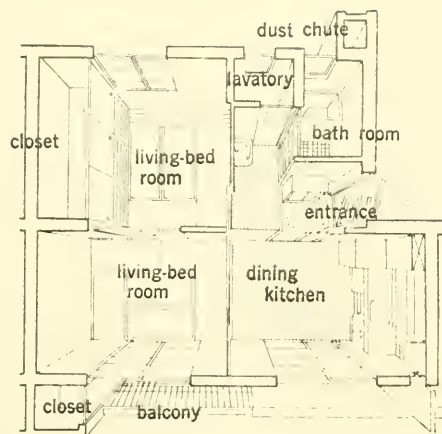
It should be mentioned that the need for housing is so great in Japan that the typical dream of newlyweds is to move into a JHC rental apartment. The next step in their lives, as far as housing is concerned, would be to move into a JHC apartment which they could purchase. The final dream, which they can envision fulfilling only at retirement age, is to purchase a piece of land outside of Tokyo with a small detached house on it.



# Standard Plan of Typical Dwelling Unit

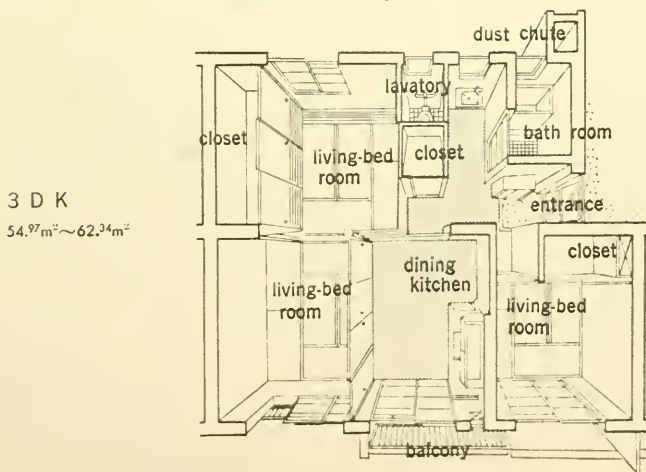
2 D K

45.43m<sup>2</sup>~50.52m<sup>2</sup>



3 K

49.73m<sup>2</sup>~55.47m<sup>2</sup>



3 D K

54.97m<sup>2</sup>~62.34m<sup>2</sup>





There have been some rather abrupt changes in the style of living of many of the Japanese who never lived in an apartment before, and suddenly find themselves dwelling in a building which is rather foreign to them. The JHC has attempted to create within each apartment as traditional an environment as is possible under the circumstances. We must remember that these buildings are constructed out of ferro-concrete for reasons of fire-proofness, and the basic structure is about as different from the typical Japanese wooden houses as one can possibly get. However, as I have mentioned, the houses are usually floored with the tatami straw mats. They have wooden beams and pillars which are typical of older houses, and the rooms themselves are separated by paper screens, all of which together do create a somewhat traditional environment. It must be said, however, that there is some disruption, some social concern by the residents, because of the conditions that they are forced to live in and because of the rapid growth of the urban population. A lot of the problems, however, become suppressed because of the docile nature of the Japanese middle class. In these units there is almost no social unrest, a situation which is totally different from that in the United States.



## B. Private Developers

### 1. Mitsubishi

For hundreds of years, the Mitsubishi Company has controlled the Marunouchi Business District of Tokyo, which is the Wall Street of Japan. In this area alone, Mitsubishi owns 35 buildings containing 2 million square feet of office space occupied by 2500 corporate tenants. Beyond the Marunouchi area, the Mitsubishi Company owns 6 million square feet of space on 350 acres of urban land. With this situation, it's no wonder that the Mitsubishi Estate Company was the last of the large corporations to get involved in housing development. The Mitsubishi Company is, however, presently expanding into the housing and land development activities very rapidly. It is developing 3 million square meters of land in Chiba prefecture for residential purposes. It also owns 1 million square meters in Kanagawa prefecture, and has recently acquired an additional 10 million square meters in Sendai for housing. The Sendai project, which is still in the planning stages, will take 7-10 years to complete. It is also developing a resort area in Shizuoka, which is near Shimoda, a large beach resort area close to Tokyo. It is developing another 10 million square meters at the foot of Mt. Fuji for multi-purpose activities, which would include housing, golf links, a speedway, and a cemetery. It has already constructed one condominium building, and is now erecting four others.

Mitsubishi has formed a new company called the Mitsubishi Development Company whose shares are owned by other Mitsubishi Companies. Its purpose is to enter into joint ventures with other companies and the national government on the very largest real estate development projects. For example, they are building a new town on 3 million square meters of land in the Fujisawa area, which will be called Fujisawa Sebu New Town. Collaborating with the Mitsubishi Development Company will be Dai-Ichi, the largest insurance company in Japan, the Mitsui Company, another conglomerate with heavy interests in construction and real estate development and the Fujisawa City Government, the managers and organizers of the project.



The Mitsubishi Estate Company, because of its size and banking connections, is able to engage in a substantial self financing program for its customers. It provides loans on a maturity of 5-20 years at 9 1/2% interest. These will represent up to 50% (recently down from 70%) of the purchase price of a house or a condominium unit. The maximum amount of the loan will be three times the annual income of the borrower. In order to finance this program, Mitsubishi Estate is able to borrow substantially from its bankers. Its borrowing rate is about 10%, so that it is in effect losing money through this program, but considers the additional cash flow worth the higher financing costs.

## 2. Sumitomo

Sumitomo is to apartments as Mitsubishi is to office buildings. It owns the largest apartment buildings in the prime residential section of Tokyo, Azabu Hill, which is very close to the downtown area as well as to the embassies and leading hotels. Apartments in this location are priced well out of range of all except the most wealthy, on either a rental or a purchase basis.

It is interesting to note, however, that the average age of the residents of Sumitomo apartments has decreased fairly rapidly over recent years. In 1962, 24% of its residents were in the 20-30 age bracket, 21% were in their 40's and 55% were in their 50's. In 1969, the picture essentially reversed itself, with 62% of the residents in their 20's and 30's, 18% of the residents in their 40's and 20% of the residents in their 50's. The explanation is that young people are earning much more money than they ever did: In Sumitomo's case the majority of its tenants have a base salary of 2 million yen per year, substantially above the national average.

It is an interesting exercise to contrast the Sumitomo apartment buildings with more traditional units. Sumitomo's rooms are single purpose rooms as in Western apartments. There are bedrooms, livingrooms, dining rooms, kitchens and laundries. Very few rooms have tatami floors; most of them have wall-to-wall carpeting and are designed for Western



living styles. One reason for this is changing the styles of living of the Japanese people, but Sumitomo is also appealing to the Western residents in Tokyo by providing them with apartments similar to those in their native countries.

The Azabu Heights apartments rent from 150,000 yen to 385,000 yen per month, plus utilities. The top of the line apartment at 385,000 yen (\$1,070) per month has a floor area of about 170 square meters, (1,820 square feet) which is large even by U.S. standards. This means that the rent is about 59¢ per square foot per month or \$7.10 per square foot per year, figures which are comparable to the U.S. experience for luxury apartments.

### 3. Mitsui

The Mitsui Real Estate Development Company, one of the most diversified and aggressive real estate companies in Japan, dates back to 1941, but has shown large growth only since the late 1950's. Its shares are held by banking organizations and other major corporations, the largest one being the Mitsui Bank Ltd., which owns 8.88% of the company. The capital of the Mitsui Real Estate Development Company will be 6.6 billion yen in 1970. The company has shown a consistent profit which has grown every year in the last ten. At the end of the first quarter of 1970, it showed a total profit of 1.2 billion yen on an annual basis.

The source of profits has changed considerably over the years. In 1960 about 60% of its profits came from the leasing of buildings. Now only about 23% of its profits come from that source, even though the gross amount of building space owned for rental increased from 120,000 square meters in 1955 to 516,000 square meters in 1970. Most of the increase came about through the construction of the Kasumigaseki Building, Japan's first skyscraper. The amount of money realized from land reclamation has remained about the same over the past ten years, although it has shown rather substantial fluctuations. Profits from land development have grown from the point where they produced only 3.6% of its profit to over 40% at present. In the last five years the amount of





land that the company owns for sale has grown phenomenally. In 1965, the company owned 234 acres. At the present time it owns 3,780 acres for sale and has an additional 13,764 acres for development.

Mitsui has also erected over 73,316,000 square meters of prime apartment space, chiefly in the Tokyo area. The Tsunamachi Park Mansion consists of two identical towers on a corner of the Mitsui estate in Tokyo. They are 19 stories tall and have four apartments per floor. The area of the apartments is identical and the price varies only by the floor on which the apartment is located. The highest priced apartment is the one on the 19th floor with the best orientation. This sells for 31,580,000 yen (\$87,500) and it has an area of 12,870 square meters (1,400 square feet). This is comparable to a typical luxury apartment being constructed in the United States today as far as size goes. The price breaks down to an equivalent of \$62.50 per square foot, which is also comparable to the prices for comparable condominiums or cooperatives in the United States. The lowest price apartment in this complex would be one located on the first floor. It sells for 26,650,000 yen, or about \$53.75 per square foot.

When these purchase prices are compared with the monthly rents for Azabu Heights apartments, which is a slightly more expensive dwelling, we see that the purchase prices are about 100 times the monthly rent. This ratio is similar to that in the United States today where the purchase price of a building is returned to the owner via rents (disregarding time factor discounting or interest charges) in about seven or eight years.

#### 4. Matsushita

To take a look at one of the less expensive houses, one might select a "National" prefabricated house, which is a high quality home manufactured by the Matsushita Corporation. This house contains about 89 square meters of space, which is equivalent to about 1000 square feet and sells for about 6.5 million yen. The lot that this would be placed on would typically contain little more than twice the floor area of the house. One such house sits on a lot containing 214 square meters or 2300 square feet. The total price of the land was 7,060,000 yen, bringing the total



cost of the house and land up to 13.5 million yen (\$37,500).

The relationship of the price of this house to the income of its residents can be illustrated by a hypothetical purchase arrangement. Assume that the purchaser places with the developer a down payment of 30% of this 13.5 million yen, or 4 million yen, leaving an unpaid balance of 9.5 million yen. According to Tokyu's regulations for mortgage financing (which can be considered as typical for the industry) for the borrower to get a loan amortizable over a 20 year period, the face of the loan must be no more than 3.5 times his annual income. This means that in order to finance a 9.5 million yen note, the borrower must have an annual income of at least 2.7 million yen. A person with this income is an executive of a large corporation, college trained, with about 15 years experience.

#### 5. Tokyu

Tokyu's current catalog of house styles contains about 100 different varieties of private, single family detached dwellings which they will build to order either on the customer's own lot or on one which they can sell him from their own inventory. These units range in price from the smallest which costs 1,863,000 yen (\$5,200) for a 38.50 square meter (410 square feet) house to the largest, which costs 6,604,000 yen (\$18,300) and contains 115.93 square meters (1,240 square feet). These sale prices range from \$12.50 per square foot to about \$15 per square foot, which is comparable to the medium price range homes in the United States.

Most of the homes produced by Tokyu are two-story homes, with the exception of the very low price units which are just small shed-like structures. The reason for the two-story feature is the high cost of land which necessitates more effective utilization of a small lot. Basically, the units tend to be rectangular in shape, but asymmetrical in plan. They all utilize pitched roofs, sometimes with one part sloping off gradually and the other at a rakish angle. Many of the houses try to effect a mountain influence which we would describe as Swiss in style, although such styles are actually indigenous to Japan. Some of the houses reflect what



we describe as ranch style in the United States, but again one which is basically Japanese in design. Typically, the first floor contains the more active use areas, such as the kitchen and dining areas and at least one room which could be used as a bedroom. The upstairs contains rooms which are used almost exclusively as bedrooms. These houses contain a very large percentage of tatami flooring; invariably, all the upstairs floors and about a half of the downstairs floors are covered with tatami.

The next chapter explains how the constructor of housing is financed in Japan. The unique method of employer provided housing is described and some of the latest information on this practice is provided.



### CHAPTER III

#### FINANCING OF HOUSING

##### A. Public Sources

The Housing Loan Corporation (HLC) is a national organization established about the same time as the Japan Housing Corporation in 1950. It is the financial arm of the national government to improve the quantity and quality of housing. HLC is headquartered in Tokyo but maintains many scattered offices.

HLC employs several modes of operation, the most common of which is the financing of owner-occupied housing. In this case, loans are made directly to the individuals who wish to build houses for their own use. As such, its clients tend to be people in the upper middle class. The loans do not cover the total cost of a unit and, in fact, are limited by law to 910,000 yen. This amount would be less than one-third of the cost of a modest prefabricated house and one-sixth of the cost of a ferro-concrete house, excluding land in both cases. The fraction of the floor area to be financed is limited to 48 square meters or about 15 tsubos, which is about half the size of an average house. The amount of land that can be acquired for this house is limited to 15 tsubos, just about the size of a Japan Housing Corporation lot.

There is no upper income limitation on the part of the borrowers from the HLC. There is, however, a more or less built-in limitation on borrower's income because those who would prefer to build a house of a size greater than the limitations or on a lot greater than the limitations will not seek out the services of the HLC. As a general rule, anyone with an income greater than 3 million yen per year will think that the 15 tsubo lot is far too small for his purposes. There are eligibility requirements on the borrower. Dealing with the necessity of the borrower to turn to the HLC as opposed to private capital sources and his ability to repay the loan out of income. In addition, every borrower must provide a guarantor who will make good on the note in case of default.





Other HLC activities include the improvement of individual housing by lending money to municipal agencies to provide housing for low income residents. HLC provides funds to non-profit agencies engaged in the building of apartments for rent, generally in the urban areas. HLC also lends money to private corporations in the process of providing housing for its employees. In a practice similar to that of the JHC in cooperating with private owners of urban land in order to obtain the maximum utilization of a particular parcel by combining differing uses in one building, the HLC will lend money to developers to finance not only the dwelling portions of a structure, but also ancillary commercial and office space. These non-housing units are typically located on the lower floors with the dwellings above.

Other HLC activities include disaster assistance through emergency loans to rehabilitate houses. HLC also finances the development of housing sites as opposed to the structures themselves and can finance the improvement of several lots to be turned over to private developers for housing construction. The HLC is also the insurance business, much like the FHA, by insuring mortgages and loans that are made by private financial institutions to borrowers for the purpose of housing.

The capital of the HLC come primarily from the government, but the HLC is, to a degree, self-financing out of its own revenues. An additional source of capital was created in 1963 by the issuance of residential lot bonds. These are securities issued by the HLC that are generally purchased by prospective purchasers of the particular lot against which the bond is issued. The person who buys the bond for the financing of the development of the lot not only has a capital investment but will also be given preference in the purchase of that particular lot at the time of retirement of the bond.

HLC has a total capitalization of almost one billion dollars. From this capitalization base, it has lent out more than \$3.5 billion dollars for the construction of over 2 million housing units and for the development of more than 17,000 hectares of building sites. HLC has insured more than \$76 million of private loans and it appears possible that the HLC could



increase the ration of the amount of insured loans to direct loans and thereby expand the money supply of private capital in housing. The growth of HLC insured loans has risen very sharply since 1964-1965 and it seems that this growth will continue into the future.

The loan program up through 1968 was based on a total of over 2 million units. Of this, about half (47%) was directed towards owner-occupied housing. The next largest segment was 18% in the improvement of individual housing. The remainder of the loans were divided up more or less evenly among the other activities of the HLC. During fiscal 1969, the plans for the HLC were to conclude loans in the amount of about \$7 billion to construct about 250 million units of housing. These 250 million units represented somewhat less than half of the total construction of government operated housing. It planned to purchase about 1600 hectares of land for development as building lots.



## B. Private Sources

As in the United States, certain types of Japanese lending institutions tend to specialize in mortgage financing. In the United States these are thrift institutions, such as savings banks and life insurance companies. In Japan, most banks are involved in industrial financing and devote a very small percentage of their assets to housing construction. The chief lenders in the mortgage area are labor credit associations as they are called in Japan, or union pension funds as they are known in the United States. At last count, there were 46 of these in Japan and they provide over 50% of all the funds for housing development (see Table 5).

Another type of financial institution active in mortgage lending is the agricultural cooperative association. These are the most popular of all financial institutions and outnumber all the other types in number of branches. Agricultural cooperative associations provide slightly more than 12% of the total mortgage financing in the country. The portfolios of other financial institutions, including banks and insurance companies, have just a small percentage of total assets devoted to housing investments.

Most financial institutions, such as commercial banks and trust banks, have about the same amount of total loans outstanding as do the labor credit associations. However, the small percentage of these loans that is devoted to housing development is indicative of the degree to which they are involved in industrial financing. This close association between financial and industrial institutions has been one of the reasons for the phenomenal growth of industry in Japan in recent years. It is, however, also one of the reasons why housing development has lagged significantly behind other sectors of the economy.

A sample survey was taken of the source of funds by the builders of small wooden apartment buildings in the Tokyo and Osaka metropolitan areas. There were 653 structures involved in the sample. The sources of funds for the builders were as follows: 33 borrowed from public institutions (presumably the HLC or the JHC), 191 borrowed from private and



Housing Loan Activities of Japanese Financial Institutions

type of institutions	no.	1969 total loans outstanding (million yen)	housing loans as a percentage of total loans
city banks	14	148,474	1.2
local banks	65	158,247	1.6
long term credit and trust banks	10	126,247	1.3
savings banks	72	65,702	1.5
credit associations	507	181,928	3.3
labor credit associations	46	131,063	65.9
agricultural cooperative associations	6,139	320,000	12.6
life insurance companies	20	79,810	2.7

Table 5





commercial institutions such as banks, 69 borrowed from relatives and friends, 227 did not borrow at all, and 133 did not indicate their source of funds. There was no information obtained as to the amount of funds borrowed, but it was considered to be a small percentage of the total building cost. As a general rule developers of small apartment **units** do not borrow. They use their own funds and build entirely out of equity. But when they do borrow, they do so from savings and loan institutions or mutual savings banks as opposed to the larger builders who tend to go to labor credit associations and agricultural cooperative associations. This practice, of course, is in great contrast to that in the United States. Here, building entirely out of equity is practically unknown, and even the individual householder manages to leverage his own equity substantially. The developers of large apartments will usually obtain long-term financing commitments before building and arrange for construction loans during the building phase.

One of the unique aspects of the financing of housing development in Japan is the practice whereby corporations loan money to their employees for housing. This is a recently instituted modification of the traditional practice of Japanese industrial firms to provide housing directly to the employees. Because this long standing practice has led to a variety of difficulties for the firms by placing them in the position of managing "company towns," many of the firms have turned their attention towards providing funds to the employees to enable them to build their own houses wherever they wish. The practice also eliminates the problem of providing (or reclaiming) housing from employees after retirement or leaving the company.

A recent government survey of the amount of money that several major corporations had loaned to their employees for housing produced some quite surprising results. A sum much larger than anyone had anticipated was being lent by companies to their employees. The largest lender was the Ajinomoto Company, which is Japan's leading producer of monosodium glutamate and similar food products. Ajinomoto has already lent to its employees 3 billion yen and expects to increase this



amount by about 1 billion yen per year. This means that Ajinomoto is lending for employee housing an amount equal to 17% of total salaries, or 37.5% of annual profits. The total amount outstanding is presently equal to 12.5% of total capital. The result is that several industrial institutions are turning into financial institutions in large measure as they make loans available to their employees for housing. No other firm is quite in the rank of Ajinomoto. The second ranked firm is Taisei Construction, which has 1.7 billion yen outstanding. Taisei expects to increase its housing loans by 1.2 billion yen during the next year. This represents about the same percentage as in Ajinomoto's case, i. e. , about 15% of salaries and 24% of profits, but only 7 1/2% of capital. Table 6 illustrates the practices of some of the other major Japanese firms in this area.

Most Japanese corporations also supply housing in one form or another to their employees. Japan Air Lines, for example, supplies a total of 1795 housing units in the Tokyo area. This amounts to company supplied housing for about 20% of all Tokyo area employees. The 1795 figure is broken down into two categories: 818 company houses and 977 dormitory accommodations. Outside of Tokyo, JAL supplies 633 housing units of which 398 are company houses and 235 are dormitories. This amounts to company supplied housing for about 30% of all non-Tokyo area employees.

Turning our attention toward the philosophy of company supplied housing, the official corporate position is that all employees should pay for their own living expenses, including the cost of housing. In other words, JAL (and presumably most other Japanese corporations) essentially adopt the United States position in this regard. The practice of JAL, however, differs in several respects from its established policy. Immediately after the war, JAL had no alternative but to provide housing in the metropolitan areas for its employees, or else they would become unable to work for the lack of even rudimentary shelter.



Loans of Private Japanese Firms to Employees for Housing

company	1969 total loans outstanding (million yen)	1970 expected annual increase	total loans as:		
			% of capital	% of profits	% of salaries
Konishi RokuFilm	118.37	11.40	0.2	?	0.38
Hitachi Shipbuilding	193.60	70.75	0.4	1.6	0.51
Kirin Beer	500.00	300.00	1.3	5.0	6.22
Nissan Motors	1,470.00	700.00	1.8	3.3	2.78
Teijin Artificial Fibers	2,780.00	1,000.00	3.5	14.7	11.13
Taisei Construction	1,700.00	1,200.00	7.6	24.2	14.73
Ajinomoto Food Products	3,000.00	1,000.00	12.5	37.5	19.81

Table 6



Since the war, there has been substantial collapse of the Japanese extended family system which has led to the abandonment of the traditional practice of the younger generation living with their parents and grandparents under the same roof. Since JAL is a leader in a dynamic, adventuresome and youthful industry, its employees tend to be among those who are most likely to seek their own housing. The most important reason for the continuation of JAL's housing program is its competition with other potential employers for the services of bright young people. One of the ways in which JAL can compete is in the amount of fringe benefits provided, and in Japan housing is the most substantial fringe benefits. Consequently, in order to attract the quality of employee it desires, JAL must provide a competitive housing program.

In view of all this, it must be remembered that in Japan employee contracts are typically lifetime arrangements. The provision of housing for employees is rather consistent with this arrangement and is a benefit that an employee could normally expect from an employer. Nevertheless, JAL's basic policy against company housing remains unchanged, and the current trend is to reduce the number of housing units supplied in kind and to increase the amount of funds made available for the employees to build their own houses. JAL's financial program begins with an employee initiated application for a housing loan. If accepted, a loan is arranged directly from JAL. This loan is limited to 3.6 million yen, which, as we recall from previous figures, is slightly more than the cost of a modest prefabricated house (without land) erected anywhere in Japan. The balance of the employee's housing loan is arranged from city banks through the good offices of JAL, with JAL acting as guarantor. In some respects it can be said that JAL and other Japanese companies act as a private HLC. The terms of the loan from JAL generally call for a repayment period of from 15 to 20 years and a below market interest rate of about 3.5% per annum. The face amount of the average JAL loan is somewhere between 2 and 2.5 million yen, which is certainly adequate for a down payment. It is important to note that a similar program could not be undertaken by a smaller company, and in fact JAL is probably the smallest company





that can undertake a comparable financial program. The average salary of the borrowers in JAL's case is about 100,000 yen per month, substantially above the national average. These employees also receive a fairly high bonus of about 50% of the annual salary, which is in turn about 10% higher than the national average.

Every five to seven years JAL conducts a survey of all employees to ascertain their personal housing programs and preferences. With this information in hand, the corporate housing program is defined by balancing company objectives against private preferences, and placing both in perspective with the national government program. One specific focus of this planning process is the forthcoming requirement for employee housing near the new international airport in Chiba Prefecture. At present there is very little housing of any type available in that area, and it will be up to JAL to provide a substantial number of units for its employees close to the new facility.

The houses that JAL provides are typically of 3DK style. These are basically similar to the JHC units, but are a little larger. JAL tends to think that the quality of its own units is substantially higher than those of JHC. This additional quality is reflected in the higher costs that JAL experiences in its construction program than does the JHC. JAL provides a mixture of Japanese and Western styles, but is definitely moving towards complete Western style in all of its housing. This shift is quite consistent with the preferences of the typical JAL employee who is among the first in Japan to adopt avant garde Western styles.

In JAL's dormitories, every employee is provided with his own room. A few double exist, but these are being quickly phased out. The units consist of one 4 1/2 to 6 mat room, which is the size of a typical small private apartment. JAL charges about one-half the rent that JHC charges; for a similar unit, JHC would charge about 8000 to 8500 yen per month, but JAL charges only about 4000 to 4500 yen. These rents are somewhat higher than those of other industrial companies.



The International Labor Organization issued Recommendation #115 relating to company housing which contained three major points. The first was that companies should recognize the importance of housing development enterprises in both the public and private sectors. The second was that companies should not provide housing at (or below) cost to their employees, except, and this is the third point, in special cases such as very remote locations which would justify company housing. In other words, the thrust of the recommendation was that industrial companies should get out of the housing business. JAL's policy, which is presumably typical of Japanese industry, is consistent with this recommendation. It is clear, however, that JAL's practice, as well as that of other corporations, is inconsistent with it. JAL sees as the only solution of the dilemma is for the government to establish a special housing fund similar to the United States Social Security program. This fund would provide financing beyond contemporary HLC practice in that it would guarantee housing as a matter of right to all individuals. I understand that this is comparable to an existing Italian program. In Japan, the agency that could carry this out (JHC) is extremely short of capital. There would have to be a substantial change in the legislative basis for the JHC to carry out this objective. The only feasible solution would be for the establishment of close public and private cooperation to expand housing development programs to this degree.



## CHAPTER IV

### NEW TOWNS

For several reasons, new towns are presently in vogue in Japan. The first and most obvious reason is the lack of available land for residential development in and around the large metropolitan areas. The second is the high profits that are available to private parties in large scale land development. The third is the demand of Japanese people for suburban residential settings with single family homes on private lots. The Japanese people have such little experience with suburban dwellings that few recognize the problem that coincide with the benefits of suburban residence. Nevertheless, the dream of the upper middle class Japanese is to own a detached house on his own lot somewhere away from the center of the city and to commute into town in the morning and back home at night. New towns fulfill these dreams.

It must be noted, however, that the Japanese use the phrase "new town" to refer to a somewhat different variety of development than has taken place in either Europe or the United States. The chief distinction is that the European and American new towns have (or attempt to have) an integral industrial and commercial base, while the Japanese new towns are primarily residential. This is not entirely true because all Japanese new towns have convenience commercial facilities and some have comparison shopping facilities as well. Two new towns (Senri Hills and Senboku) do have small industrial estates adjacent to them, but these do not support a significant percentage of the new town residents.

The most significant developments have been those in the Osaka region, namely the Senri Hills and Senboku new towns. Senri adjoins the Expo-70 site north of Osaka and Senboku is situated on the opposite side of the city to the south. In the Tokyo area, the Tokyu Electric Express Railway, Ltd. has developed a very large new town to the west of Tokyo called Tama Country Town, which is situated along its own private railway lines. The Tokyo Metropolitan Government, in cooperation with the



JHC and Tokyo Metropolitan Housing Supply Corporation is developing another new town in the same area as Tama Country Town, but just north of it--called Tama New Town. (The word "Tama" in the names of these two towns refers to the pears which were grown in the area before it was subjected to development.)





#### A. Tama Country Town

It is most convenient to start with a discussion of Tama Country Town. Tama Country Town is a logical development for the Tokyu Company since it is a private railway company whose lines extend to the west of Tokyo and form one of the major commuter arteries into the city. At the same time, the company has extensive experience in the real estate business, specializing in the development of private homes. It also operates one of the largest brokerage agencies in the entire country for the buying and selling of private homes.

Tama Country Town is located in a hilly area in the southwestern part of Tokyo. It has a long rectangular shape stretching nine miles along its east-west axis and up to six miles along its north-south axis. The site covers 10,700 acres. Tama Country Town is the name of a private real estate development as opposed to a political unit and one of the great problems in its development has been the fact that it stretches across four separate municipalities (Kawasaki, Yokohama, Machida, Yamato), each with its own administrative regulations, zoning and planning codes. The projected population is 400,000. Tama Country Town was primarily farm land in its former state and was purchased by Tokyu directly from the farmers. Some, however, refused to sell, and Tama Country Town, instead of being one continuous unit as we might expect, is composed of three separate parcels, each of which is separated by a narrow strip of privately held and presently farmed land.

Two methods of purchase were employed by Tokyu. The first is the direct cash-for-land transaction. The second is a complex cooperative undertaking between Tokyu and the former owners called "land readjustment," a procedure by which Tokyu and the landowners enter into a partnership. In the partnership, the owner retains title to the land, or to an equivalent piece of land, but transfers the management of the development to Tokyu. Tokyu is thus able to create a more coordinated development at a lower cash outlay while the landowners receive a greater return for their land because they retain ownership throughout the development phase.



This practice has the blessings of the political administrations in Japan and is frequently employed as an alternative to the use of eminent domain powers in publicly sponsored developments.

The Tokyu Company last year sold 1500 houses and between two and three thousand lots of land, one-third of which were located in Tama Country Town. The average lot size was 70-80 tsubos (2400-2800 square feet) and the average house size was about a third of that, or 20-30 tsubos (700-1000 square feet). Most of houses and lots cost from 15-20 million yen. There are several apartment units available for purchase, which range up to 1600 square feet in size. The least expensive house that would be built in Tama Country Town would be a prefabricated unit selling for about 13.5 million yen (\$37,500) including land. The same amount of money would purchase one of the best apartments.



## B. Tama New Town

Tama New Town, the public enterprise development to the north of Tama Country Town, contains about 7,400 acres. Its projected population of 400,000 will work in the industrial areas of Yokohama and Kawasaki cities. Although it is somewhat smaller in area than Tama Country Town, it is one continuous tract of land and should be able to accommodate its residents quite readily. The town will be composed of 23 separate neighborhood units, each of which will be self sufficient with public facilities, such as roadways, water supplies, parks, open spaces and schools. There will be one large town center equipped with shopping, parking, and other commercial facilities. Wherever possible, pedestrian and vehicular traffic routes will be separated in order to minimize traffic accidents. Green urban spaces will be preserved both for aesthetic reasons and recreational use. Of the entire area of Tama New Town, approximately 50% will be devoted to residential uses, as building sites for houses. Of the remaining 50%, about 18% of the land will be for roads, 11% for open space, 9% for park facilities, 8% for educational facilities, and 5% for commercial facilities.

The basic development unit, as mentioned above, is the neighborhood, each of which will contain several residential districts. Each district will be grouped around two primary schools and one secondary school. Each neighborhood unit will have its own nursery, kindergartens, clinics, retail shops and other facilities which are necessary for daily life. The town center will accommodate the larger commercial facilities and will contain amusement facilities and government offices, banks, a library, a central park, and large parking facilities. The Keio and Odakyu commuter railways will extend their existing lines to the project site from Shinjuku station, where both own very large department stores.



### C. Senri Hills

Senri Hills is a new town located 10 miles north of Osaka, occupying parts of both Suita and Toyonaka Cities. It covers 4,000 acres of land and the total project costs is estimated at \$519 million. Senri is a suburb of Osaka which has over three million residents. Senri was built on an entirely undeveloped area of land which was hilly and covered with dense bamboo forests. The project was originally conceived by the Osaka town government and was carried out under its direct supervision. The primary objective was to build a new town for the working people of the city of Osaka.

Senri is most clearly distinguished from other existing new towns by the mix of available housing types. It is hoped that the inhabitants will belong to various socio-economic levels and the planners are aiding this objective by insisting on a variety of housing types within the town. Of the 37,330 new housing units that were constructed through the end of 1969, 10,392 were publicly operated houses, 10,392 were Osaka Prefectural Housing Association houses, and 5,863 were JHC houses. This means that two-thirds of all houses were built with public assistance. This does not include the 4,720 houses built by companies for their employees. Only a very small number, namely 6,073, or approximately one-sixth of all houses, are privately owned. The differences among types of houses paralleled the differences among their sponsors. The detached unit are, of course, one or two storied private homes built on lots. The others are apartment houses of various heights, with the JHC units typically being four or five story structures and those of the other developers ranging up to seven stories.

As in Tama New Town, the smallest community unit is the neighborhood. In Senri Hills a neighborhood consists of 50 to 100 dwelling units built around a children's playground. Fifteen to twenty such neighborhoods form a section, consisting of 1000-1500 dwelling units with one kindergarten. Two sections make a unit which has its own primary school and one or two neighborhood centers. There are 12 such 2500-3500 household units in Senri New Town, each occupying a site of about 25 acres.





Thirty-five units form a zone and Senri New Town consists of three zones, north, central and south, each with an express railway station, a bus terminal, a municipality branch office, banks and shopping arcades. Parks and green lands occupy approximately one quarter of the land in Senri. Generally speaking, these parks are located on the periphery of the town and form an insulating buffer zone between the town and its surrounding communities. The goal was to give the residents a sense of identity with their new town.

Almost all public services and most private services are available within the town borders, certainly those that are necessary for most day-to-day activities. One very important advantage to the working-class residents of Senri is access to Osaka. Two express trains, the Hankyu Railway and the Kita Osaka Railway, run between Osaka and Senri. In addition, the terminus of the New Tokaido Line, which carries the "Bullet" train between Tokyo and Osaka, is located between Senri and Osaka. Senri is also situated very close to Osaka International Airport and is on two main highways.

Since Senri is about 90% completed, it makes little sense to discuss the original prices of the various dwellings. It is a good idea to point out, though, that since five-sixths of all housing is either public or company supported, most of these units were sold well below market prices. The building sites for private houses were also sold below market prices in order to get the land developed very quickly. The construction of private homes, however, had to be done by private contractors at market rates.

The Public Enterprise Bureau of the Osaka Prefectural government has provided some figures detailing the sources and applications of funds with regard to the construction of Senri. The public cost of building the town was 60 billion yen, broken down as follows: cost for purchasing the land was 11.8 billion yen; the cost of public overhead development was 29.5 billion yen; the balance was made up by incidental expenses incurred during construction. In addition, private parties interested in the construction of Senri spent 128 billion yen. Thirty-five billion yen was spent on the building of houses and the rest was devoted to the extension of



railroads, the construction of new transportation terminals and the extension of utility lines. All expenses in the last category were funded by the utility and transportation companies themselves. The 60 billion yen public cost was funded primarily by the sale of land, which yielded 38 billion yen. Only a tiny fraction (less than 0.5 billion yen) of the cost of Senri was realized from grants in aid from the national government. The balance of the development costs was funded by bonds that were floated specifically for the Senri development and by a loan from the Osaka Prefectural Government.



D. Senboku

Because of the success that the Osaka Prefectural Government had with Senri Hills in controlling land prices and in creating a pleasant living environment for its working people, it has begun to undertake the development of a comparable new town called Senboku, located about 12 miles south of the city. Senboku is about 10% completed now, although all the land has been acquired. As in other new towns, the land does not form a contiguous tract and there are pockets which could not be purchased from the existing owners.

Senboku will occupy 3800 acres when completed and will cost the developers \$310 million. It is anticipated that by 1974 a total of 47,000 dwelling units will be constructed. The mix of these units is anticipated to be somewhat different from that in Senri. Of the 47,000 total, 15,000 will be detached houses, 12,500 will be publicly operated houses, 7,500 will be company houses, 9,000 will be houses built by the Osaka Prefectural Housing Association and 3,000 will be built by the JHC. One lesson that the Osaka planners learned from the construction of Senri is that the town should be integrated with adjoining communities. In Senri, this was prevented because green space was placed as a buffer between the new town and the adjacent communities. This has not been done in Senboku and practically all the green space is located well within the town.

The planning of Senboku will be accomplished in much the same fashion as in Senri, with various neighborhood units, town centers and zones. A unique feature is the construction of what is called "Young Town," which will provide residences and a recreational center for single men and women. Young Town will occupy 50 acres and will accommodate 11,000 people in apartments. Emphasis will be placed on sports and recreational facilities. Another interesting point is that Senboku covers an area in which pottery relics and ancient kilns have been discovered. There are also historic shrines of cultural significance. These have been carefully preserved and will remain as part of the town plan.



## APPENDIX

### U.S. -Japanese Equivalents

#### A. Counting

The Japanese method of counting is illustrated by the following table:

1	= ichi
10	= jeu
100	= hyaku
1,000	= sen
10,000	= man
100,000	= jeu-man
1,000,000	= hyaku-man
10,000,000	= sen-man
100,000,000	= oku-man
1,000,000,000	= hyaku-oku

Obviously, it's easy to translate from one system to other, but it must be remembered that when a Japanese counts he thinks in multiples of ten thousand, whereas a Westerner will tend to think in multiples of one or one hundred thousand.

#### B. Area

The Japanese employ two systems for the measurement of area. One is the metric system, in which the basic unit is the square meter. The other is a purely indigenous system. Its basic unit is the tatami, which is the straw mat used in tatami as they are actually built, there is a standard tatami measurement, 90 centimeters by 180 centimeters.





When discussing areas inside a residence, the number of tatami mats is the standard unit of measurement. For example, a room can be referred to as a six-mat room or an eight-mat room. When discussing land areas, however, the tsubo is used. The tsubo is equivalent in area to two tatami.

C. Money

The Japanese unit of currency is the yen. 360 yen equals one dollar according to the official transaction rate.

D. Time

The Japanese use the day-month-year system and are quite familiar with the naming of the months and the numbering of the years according to the Western system. However, here too they employ an indigenous system of their own, in that the year is reckoned according to the year of the Emperor's reign. For example, 1970 happens to be the forty-fifth year of Emperor Showa's reign. December 1, 1970 will be written as 45.12.1

A useful exercise which brings together most of the units just described is a comparison of the construction costs between Japan and the United States. Construction costs in Japan are typically reckoned in man-yen per tsubo; those in the United States in dollars per square foot. It can be shown that costs as expressed in man-yen per tsubo are roughly the same as costs expressed in dollars per square foot.

One tatami = 90 cm. x 180 cm. = 16,200 cm. = 1.62 square meters

One tsubo = two tatami = 3.24 square meters

One square foot = 0.093 square meters



$$\frac{1 \text{ square foot}}{0.093 \text{ square meters}} = \frac{x \text{ square feet}}{3.24 \text{ square meters}}$$

$$x = 34.8$$

Therefore, one tsubo = 34.8 square feet

One dollar = 360 yen

One yen = \$0.00278

Man-yen = \$27.80

$$\frac{\text{man-yen}}{\text{tsubo}} = \frac{\$27.80}{34.8 \text{ square feet}} = 0.8,$$

which in order of magnitude terms, is approximately equal to 1.0



## BIBLIOGRAPHY

1. Bureau of Statistics, Office of the Prime Minister, Japan:  
1968 Housing Survey of Japan
2. id., Statistical Handbook of Japan
3. Dore, R. P., City Life in Japan (Berkeley: University of California Press 1958)
4. The Japan Times, Ltd., Economic Survey of Japan (1968-1969)
5. The Ministry of Construction, Japan's Construction and Land Development - 1969.
6. Nishihara, Kiyoyuki, Japanese Houses: Patterns for Living (Tokyo: Japan Publications, Inc. 1967)
7. U. S. Department of Housing and Urban Development,  
1968 HUD Statistical Yearbook
8. , Sizing Up Tokyo (A report on Tokyo  
under the Administration of Governor Ryokichi Minobe - the 1969  
"White Paper")

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